



We do the right thing.

Defense Waste Processing Facility Melter Bubblers

Presentation to:
SRS Citizens Advisory Board

9/28/10

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EM Environmental Management
safety ♦ performance ♦ cleanup ♦ closure

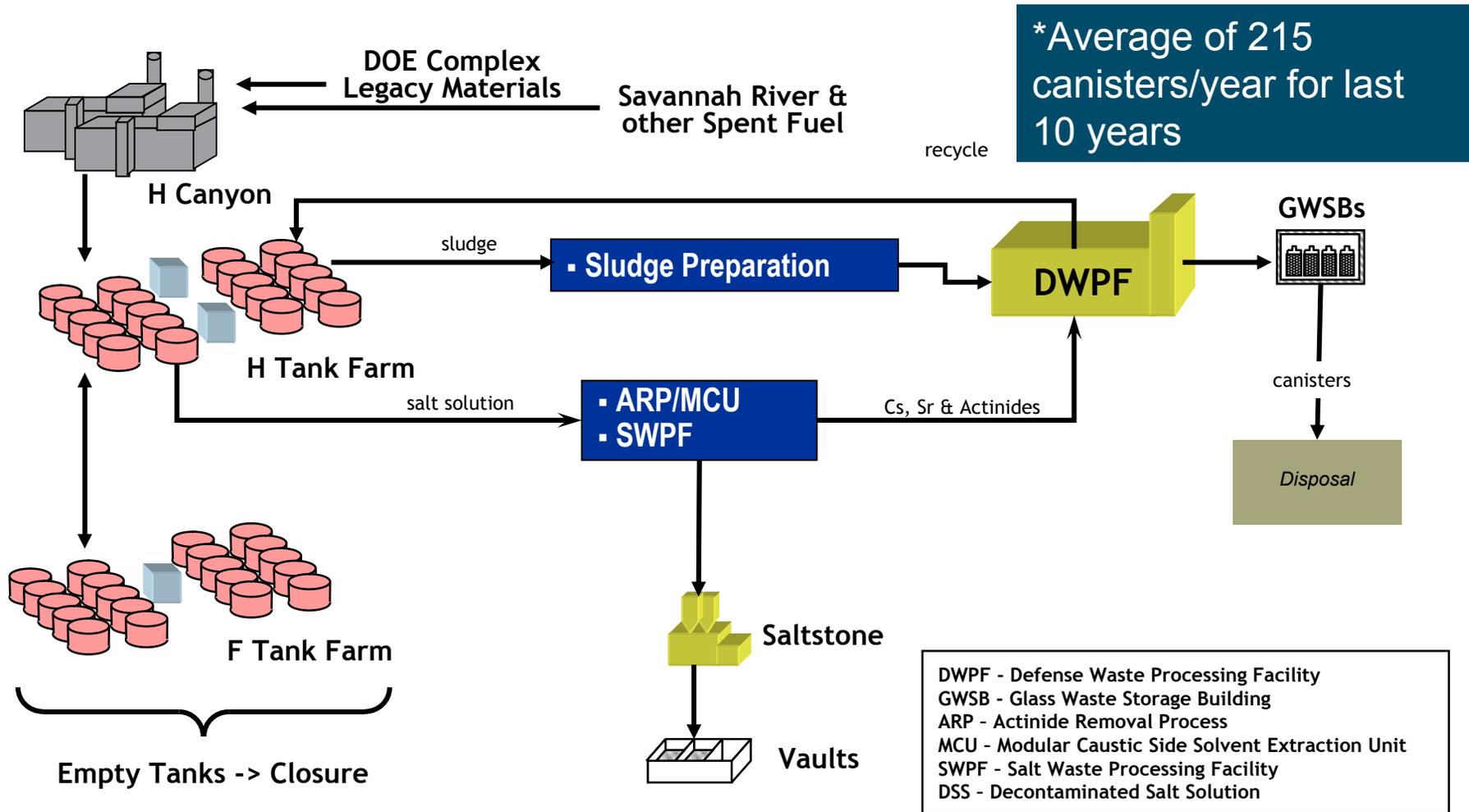
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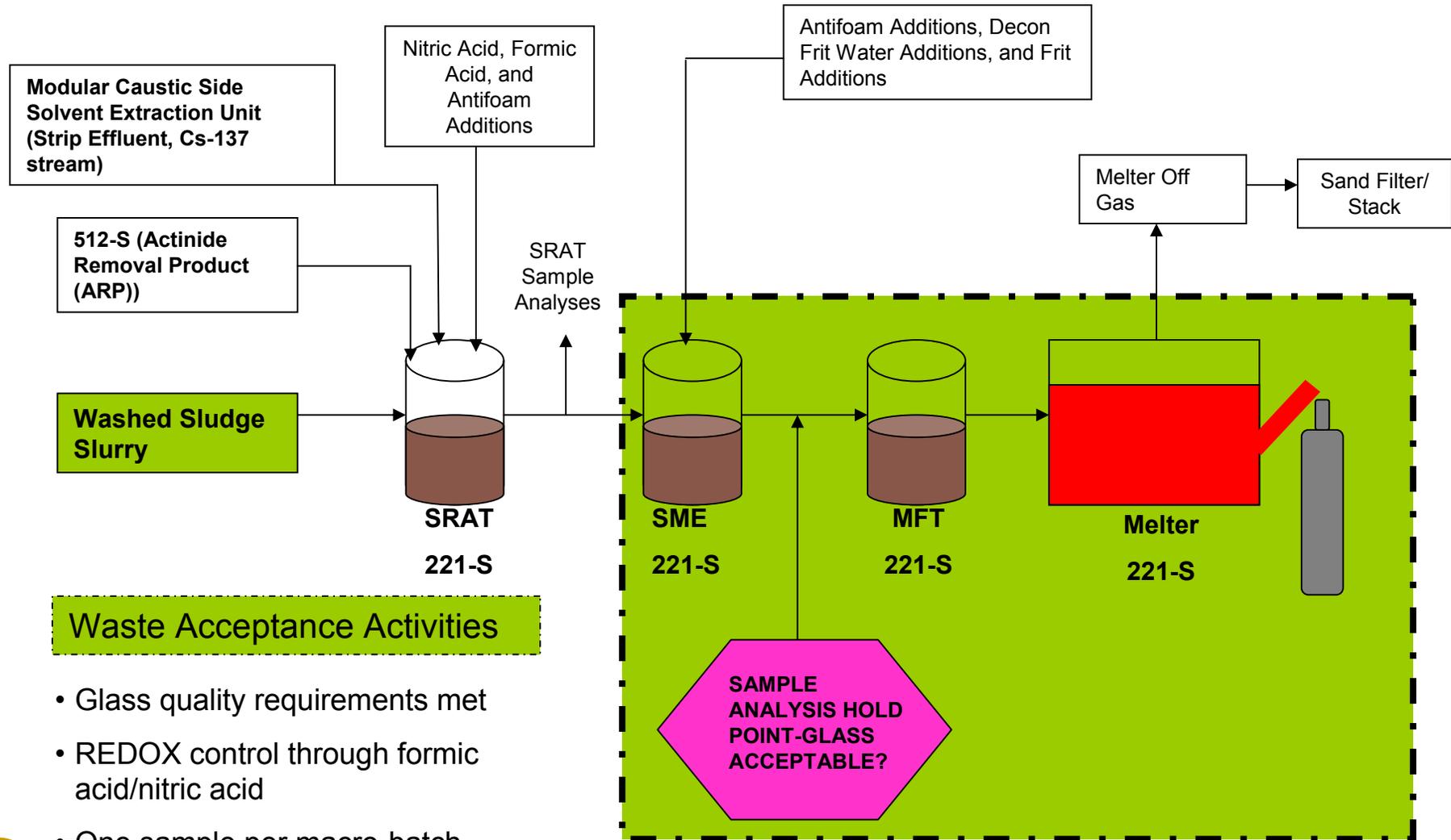
- DOE-SR
- DWPF Facility Engineering
- DWPF Operations
- EnergySolutions/Vitreous State Laboratory
- SRNL



- Liquid Waste System
- DWPF Overview
- Bubblers Implementation
 - Controlled, systematic approach
 - Reliably install and operate bubblers
 - Maintain glass quality requirements
 - Enhance sludge disposition rate
- Specific Questions
 - Melter impacts
 - Cold-cap coverage: volatiles carryover

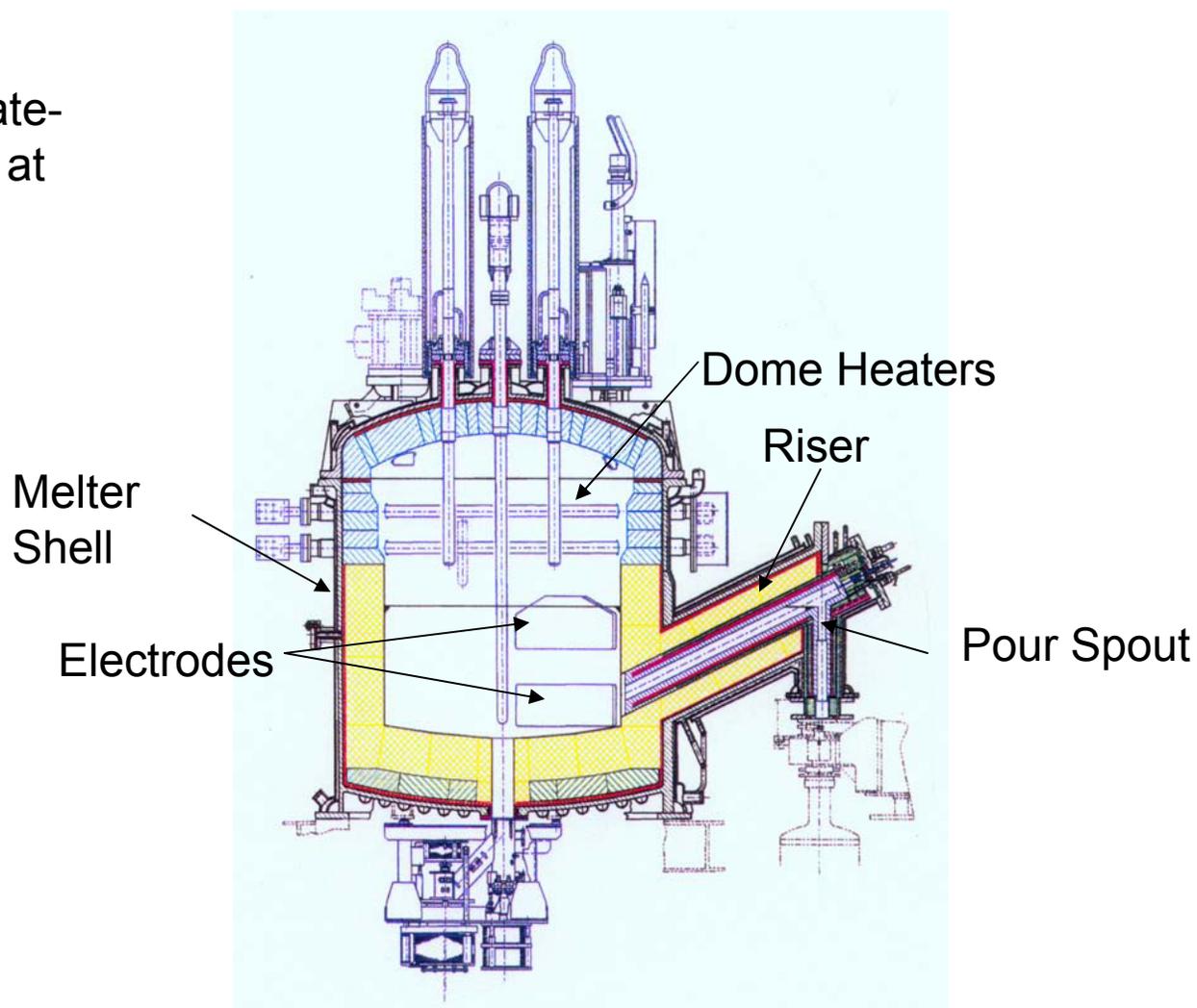




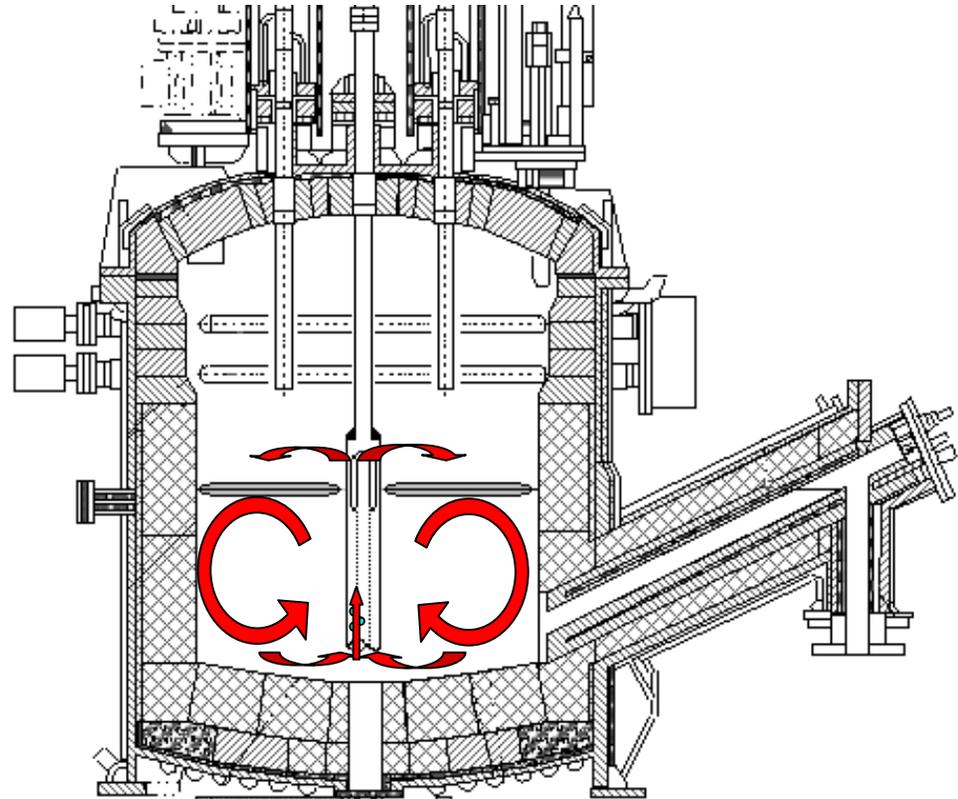


Melter

*Currently rate-limiting step at DWPF



- Glass Pump Provides ~6% Increase In Canister Productivity

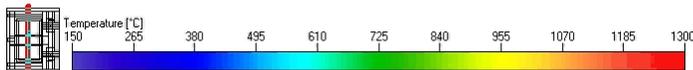
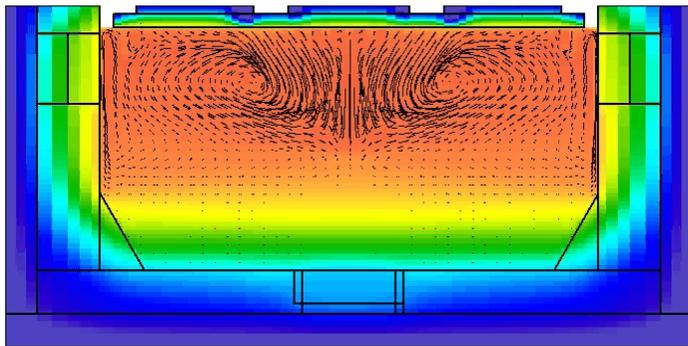


- Implement bubblers in existing Glass Melter to increase melt rate/waste throughput
 - Maximize number
 - Symmetry
 - Location with respect to feed point
 - Ease of remote access
 - Minimize impact on remote jumpers

Duratek HLW model, Case 2A: Feed, 2el
Front View (YZ)



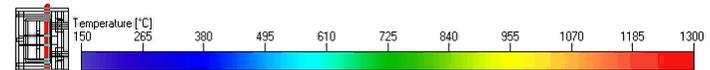
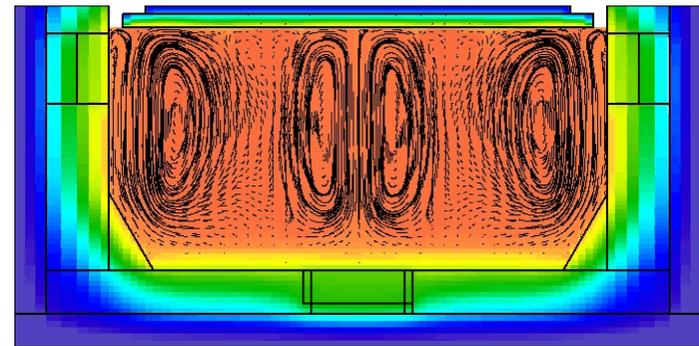
Unagitated Melter
(natural convection)

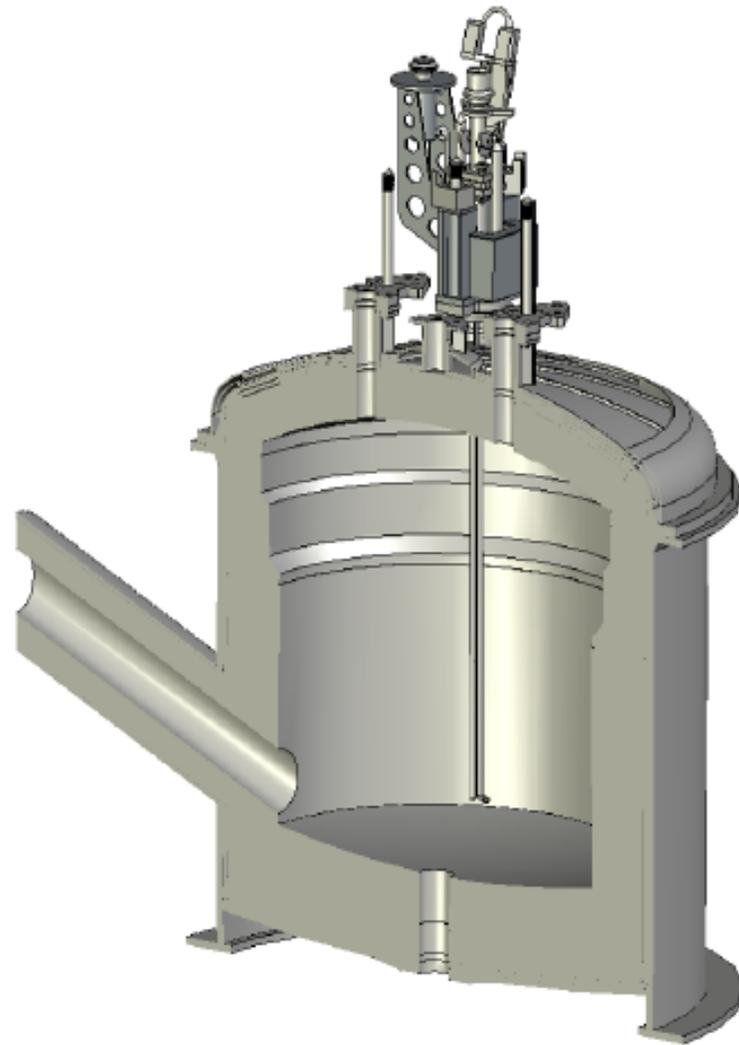
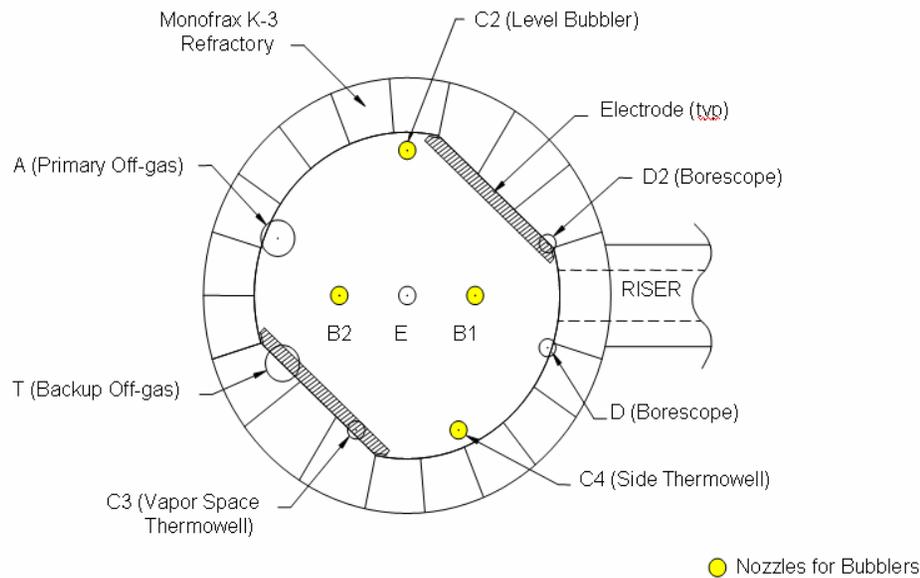


Duratek HLW model, Case 5A: Feed, 2el, bubl
Front View (YZ)

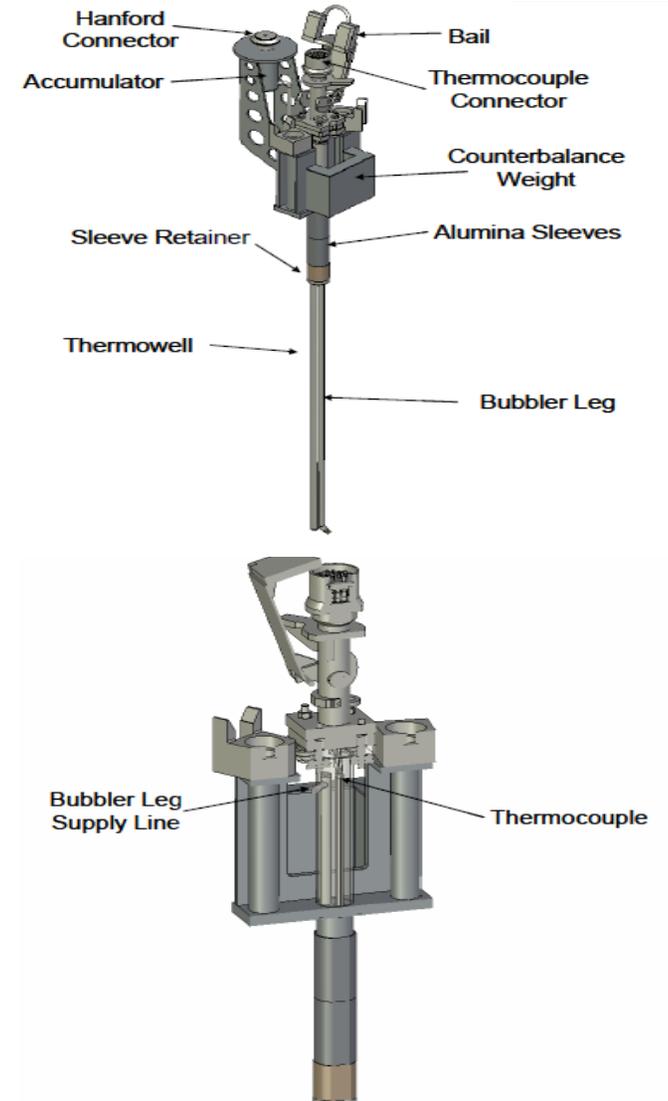
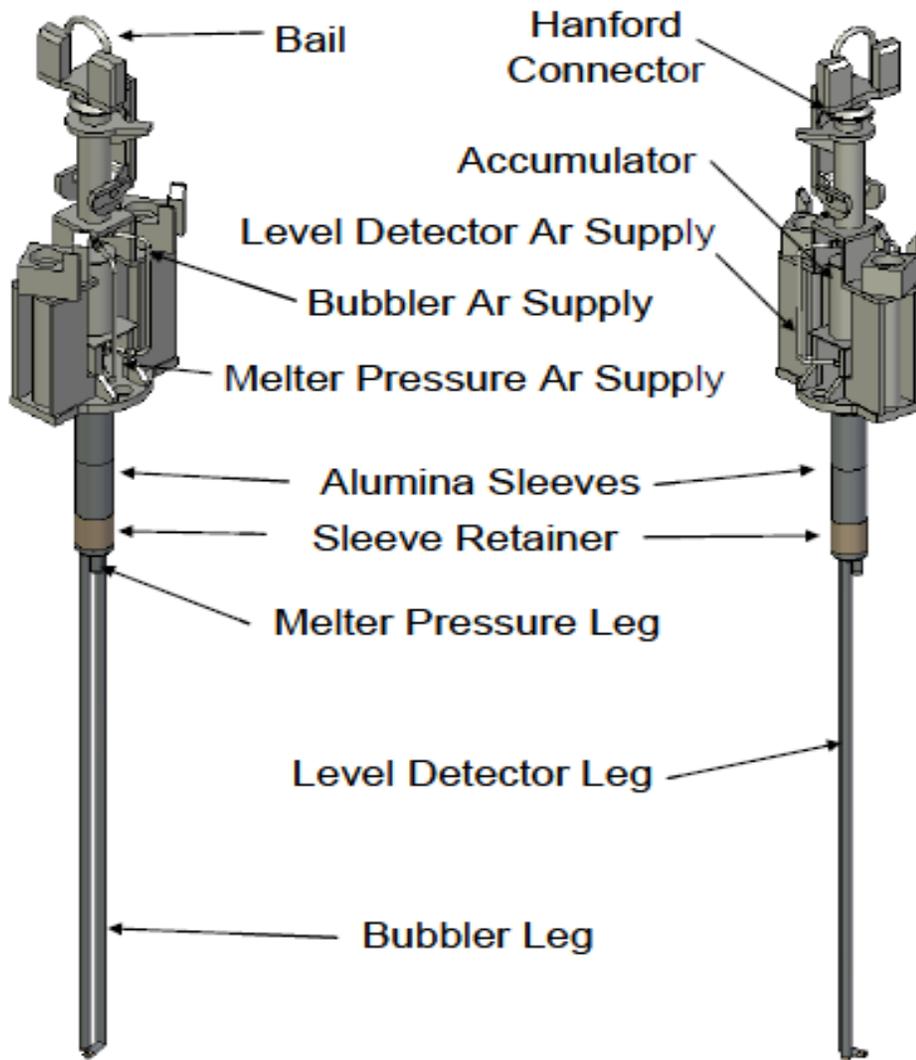


Bubbled Melter
(forced convection)



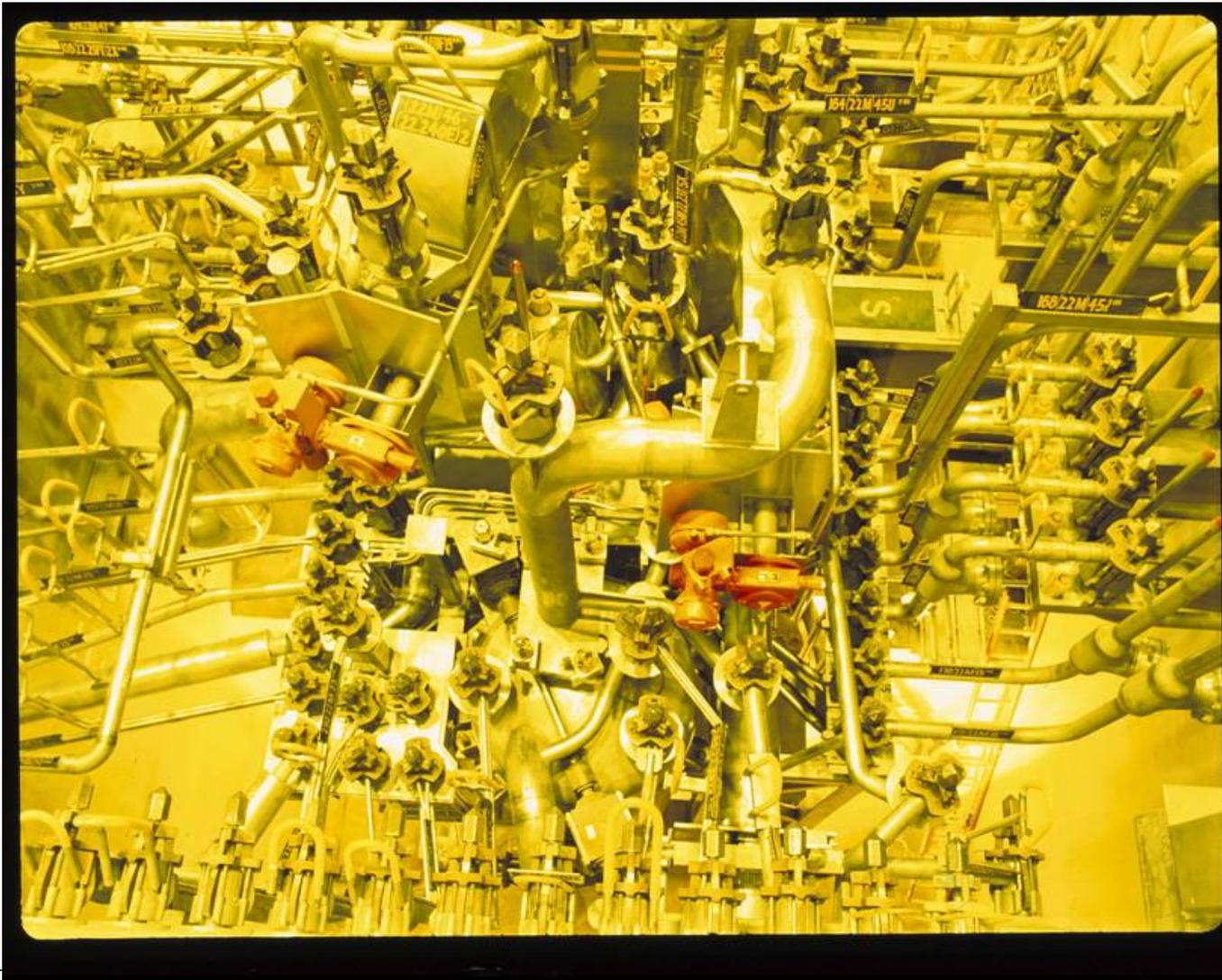


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Top View of Melter From South Wall

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EM Environmental Management

safety ♦ performance ♦ cleanup ♦ closure

- Installation and operation of the bubbler systems following a safe, systematic, and controlled approach
- Testing program is being completed to determine any safety and operational impacts to the system
- Bubbler installation on track to September 2010
 - Detailed controlled startup
 - Learning process as with all enhancements/modifications to existing facilities
- Same glass quality requirements met
- Enhanced the production capacity to accelerate the sludge disposition rate



- Knowledge of test programs, and previous melters operated under similar conditions, were used to develop the strategy for implementation at DWPF

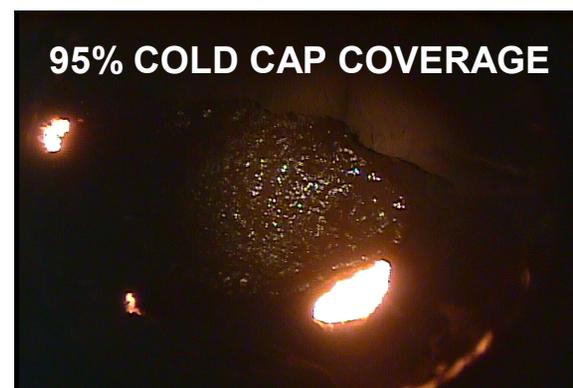
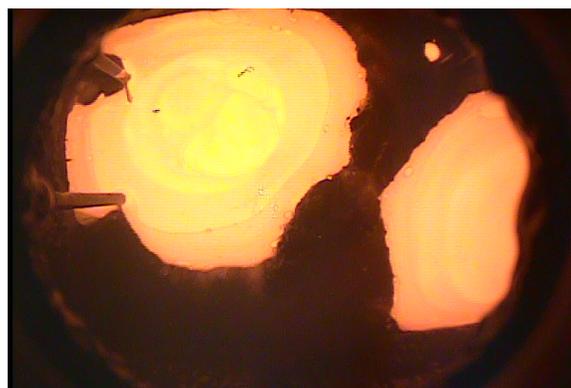
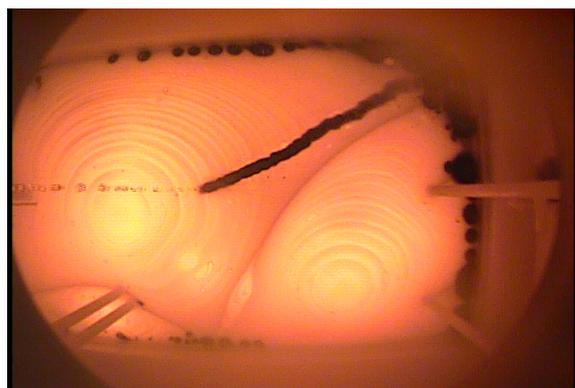
Parameter	DWPF	M-Area Melter	LAW Pilot Melter
Geometry	Cylinder	Rectangular	Rectangular
Melt surface area, m ²	2.6	5.0	3.3
Glass contact refractory type	K3	K3	K3
Glass contact refractory thickness, in	12	10	12
Number of bubblers	4 assemblies	10 assemblies	8 assemblies
Closest distance from bubbler injection point to refractory wall, in	~5	~4	~2
Closest distance from the bubbler injection point to floor refractory, in	>2	2	2
Total glass produced, lb	2,963,000*	2,175,000	7,762,000



Key Parameters in DWPF Bubblers

- Cold cap is critical to the operation of the DWPF melter and will be maintained with bubbler operations
 - Minimize carryover of volatile species (e.g. halides)
 - Off-gas system life not significantly impacted
 - Minimal changes in radionuclide carryover (e.g. Tc)

COLD-CAP BUILD-UP DURING NORMAL OPERATIONS



DM1200 Experimental Melter at VSL-CUA



- Bubbler implementation strategy is a comprehensive plan to address specific technical issues and integration within the plant
 - Sludge batch planning
 - Transfer control
 - Safety analyses
 - Melter impacts
 - Glass quality
- Controlled strategy will be used to install and operate bubblers at the DWPF facility
- It is recognized that, as with any modification, there is a start-up phase and continuous improvement that will take place as the bubblers are operated and more knowledge is gained





